5. A dextran-coated surface according to claim 2, wherein said protein is bovine serum albumin (BSA).

8. A dextran-coated surface according to claim 1, wherein said carrier surface is a surface of a mass-sensitive sensor.

9. A dextran-coated surface according to claim 8, wherein said mass-sensitive sensor is a surface acoustic waves conductive component.

10. A dextran-coated surface according to claim 1, wherein said carrier surface is a surface of an optical or electro-mechanical sensor.

REMARKS

With regards to the Examiners comments concerning the "Information Disclosure Statement", it is noted that in the introductory part, the prior art has been discussed on the basis of some references. This has been common practice at least for the last forty years during which the undersigned has been working in the patent field.

Claim Objections

Claim 3 has been corrected to overcome the objection of being a duplicate of claim 2.

Claims 1 – 10 have been amended with a view to overcoming the Examiner's rejection of these claims under 35 USC 112. In particular claim 1 has been restricted to define only a T-BSA photolinker as specifically disclosed in the description.

The antecedent basis problems have also been attended to.

The Examiner has rejected claims 1 and 6 under 35 USC 102(b) as being anticipated by Swan et al. (US 5 563 056). He has further rejected claims 1 and 6 as being anticipated by Hubbell et al. (US 5 529 914) and, furthermore, by Chabrecek et al. (US 6 099 122) and he has rejected claims 2 – 5 under 35 USC 1039(a) as being unpatentable over Swan et al. or Hubbel et al. in view of Chai-Gao et al. (US 5 858 802). He has finally rejected claims 2 – 5

and 7 – 10 under 35 USC 103(a) as being unpatentable over Swan et al. or Hubbell et al. in view of Wessa et al. (WO97/43631).

Swan et al. (US 5 563 056) discloses a preparation of cross-linked matrices containing covalently immobilized chemical species and unbound releasable chemical species wherein dextran is covalently bound to a photolinker. In this way, a photo-active dextran is formed. The photo-active dextran is mixed with a biologically active material and then irradiated by UV light. As a result, a cross-linked matrix is formed in which also the biologically active material is enclosed.

Hubbel et al. (US 5 529 914) discloses a method for the encapsulation of biological materials wherein first a polymer is formed in which the biological material is contained and which is then solidified by photo-induced polymerization. The biological material is immobilized thereby and protected. However, it also can no longer react with reactants so that it is not suitable for the detection of compounds.

Chabrecek et al. (US 6 099 122) is, in a first part, similar to Swan. Then, in a second part, a photoactive substance is bound by irradiation to a surface whereby, after being bound to the surface, functional groups are present on the surface. This means however that an intermediate layer is formed.

Chai-Gao et al. (US 5 858 802) and Wessa et al. (WO97/43631): – In each publication, the biologically active material is attached by way of a photolinker directly onto a surface.

The present invention resides in a dextran-coated surface on a carrier with a surface to which the dextran disposed as a coating on the surface is attached by co-immobilization of a mixture of a T-BSS photolinker and the dextran.

In contrast to Swan et al., the dextran is not first modified but the unmodified dextran is mixed with the photolinker and interlinked by irradiation and fixed to the surface. Since the dextran does not need to be modified, the manufacturing costs are reduced so that the sensor structure is relatively inexpensive. Also, the biologically active material is not enclosed in the matrix, but is only bound at the surface.

In Hubbel et al., the biological material is encapsulated in a polymer which is polymerized by exposure to light, so that the biological material is immobilized and protected but will no longer react with a reactant and therefore is not suitable for detection purposes.

Fig. 1 shows a base of polyimide (or a substrate with a coating of polyimide) and a dextran coating. The photolinker T-BSA is shown between the two. But there is actually no space. It is shown in this way for facilitating the understanding. The T-BSA is actually mixed with the dextran, that is, it is disposed in the dextran coating space so that the dextran and the TBSA photolinker are both disposed directly on the polyimide surface.

Such an arrangement as defined in claim 1 (and claim 6) is certainly not disclosed in the cited references. Reconsideration of the rejection of claims 1 and 6 as being anticipated by Swan et al. and by Hubbell et al is respectfully requested.

Claims 2 to 5 and 7 to 10 relate to advantageous features for the arrangement as defined in claim 1. Claims 2 to 5 define certain photolinkers, that is, compounds, which are known as such, but which are considered to be advantageous in connection with the present invention.

Claims 7 – 10 relate to the carrier surface or surface structure and define features, which are considered to be advantageous in connection with the present invention.

It is pointed out that all these claims are dependent directly or indirectly on claim 1 and, consequently, include all the features of claim 1. They should be considered to be patentable together with claim 1 already for that reason.

Reconsideration of the dependent claims 2 to 10 is respectfully requested and allowance of claims 1- 10 as amended is solicited.

Respectfully submitted,

K. Bach

APPENDIX

MARKUP VERSION TO SHOW CHANGES MADE

The description has been amended as follows:

Page 3, first paragraph:

In order to employ commercially available SAW-devices as mass-sensitive transducers in biosensors, the SAW surface must be coated with a bio-sensitive layer of proteins which then detect the respect analyte molecules in [the] a sample.

Page 7 second full par. (lines 6-24):

The sensor is first flushed with 10 mH HEPES-buffer (pH 7.5) in order to assume the basis line. The one-step activation occurs with a freshly prepared mixture of 100 mM NHS and 400 mM EDC. This solution has a conductivity of 14.4 mS/cm, which is substantially higher than the conductivity of 550 µS/cm of the HEPES buffer. The sensor reacts with a frequency increase of about 100 kHz. Subsequently, the sensor is again flushed with HEPES buffer and then a solution of the biomolecule to be immobilized is applied. The biomolecule - in the present case monoclonal antibodies against urease - is present in a 10 mM acetate buffer at a pH = 5.0. Fig. 2 shows a frequency reduction, which is caused by the mass increase on the sensor surface. From the sensor behavior, the slow adjustment of the equilibrium is apparent which is reached after about 45 to 50 minutes. Then flushing with HEPES buffer takes place again. Subsequently, the excess NHS ester groups are de-activated by ethanolamine. In the last step for the preparation of the biosensor samples [of] 4 mg/ml BSA are applied in order to block the non-specific binding sites.

The claims have been amended as follows:

1. A dextran-coated surface on a carrier having a carrier surface with a connection between [the] dextran [and] disposed as coating on the carrier surface formed by a T-BSA photolinker, said dextran-coating being attached to said carrier surface by co-immobilization of a mixture of the dextran and the T-BSA photolinker.

3. A dextran-coated surface according to claim 1, wherein said photolinker is a 3-trifluoromethyl-3-(m-isocyanophenyl)-diazirine (TRIMID)-modified [protein] polysaccharide.

5. A dextran-coated surface according to claim [1] 2, wherein said protein is bovine serum albumin (BSA).

8. A dextran-coated surface according to claim 1, wherein said carrier surface is [the] a surface of a mass-sensitive sensor.

9. A dextran-coated surface according to claim 8, wherein said mass-sensitive sensor is a [component capable of utilizing] surface acoustic waves conductive component.

10. A dextran-coated surface according to claim 1, wherein said carrier surface is [the] a surface of an optical or electro-mechanical sensor.